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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/594,431

09/26/2006

Jens Peter Hansen

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EXAMINER

JOHNSON, KEVIN M

ART UNIT

PAPER NUMBER

1793

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/594,431	<b>Applicant(s)</b> HANSEN ET AL.	
	<b>Examiner</b> KEVIN M. JOHNSON	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 08 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 15-47 is/are pending in the application.
- 4a) Of the above claim(s) 44-47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-47 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/26/2006, 11/30/2007, 12/19/2008 and 12/22/2008</u> .        | 6) <input type="checkbox"/> Other: _____                          |



**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of Group I, claims 15-43 in the reply filed on 1/8/2009 is acknowledged.
2. Claims 44-47 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a non-elected invention.

***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:  

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claim 43 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Claim 43 recites the limitation "the hydrated product is subsequently re-introduced into a preheater" in lines 1 and 2 of the claim. There is insufficient antecedent basis for this limitation in the claim. No prior mention is made of an introduction to a pre-heater, and therefor a re-introduction is not supported. For the purposes of examination this limitation has been interpreted as an introduction to a pre-heater.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 15, 18 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Societe D'Electro Chemie (GB 881813, hereafter D1).

In regard to claims 15, 18 and 27, D1 teaches a method of hydrating CaO particles. An exemplary embodiment of this method includes contacting CaO particles with water vapor in a reaction vessel at a temperature of 120-125°C and a pressure of 60 mmHg (0.079 atm) (example I). These reaction conditions satisfy the requirements of the claims.

In regard to claim 30, D1 teaches that the pressure of the process may be carried out at 100 mmHg (0.13 atm) (example I).

### ***Claim Rejections - 35 USC § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 39-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over D1, as applied to claim 15.

In regard to claim 39, while D1 does not teach that the hydration reaction occurs on the surface of the particles, one of ordinary skill in the art at the time of the invention would realize that the hydration reaction in the process taught in D1 could only occur at the surface of the particles. This is because the surface of the particles is the only location where the CaO and water vapor are both present.

In regard to claims 40 and 41, D1 teaches that after 20 minutes the degree of hydration is only 1/3. It would have been obvious to one skilled in the art at the time of the invention to produce CaO with a degree of hydration of less than 50%. This modification would have been motivated by the teaching in D1 that after 20 minutes the CaO is only 1/3 hydrated.

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12. Claims 16, 19, 28 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over D1 as applied to claim 15 above, and further in view of Corson (US 2309168).

In regard to claim 16, D1 fails to teach a reactor that meets the requirements of the claims.

Corson teaches an apparatus for hydrating lime. The apparatus includes a device which has 2 inlets at the upper end that supply lime and water to the vessel. The product of the water lime mixture passes out the bottom of the vessel (figure 1 and page 5, lines 3-36).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the reactor taught by Carson in the process taught in D1. Such a modification would have been motivated by the teaching in Carson that the reactor is used to slake lime.

In regard to claims 19 and 28, D1 teaches a temperature of 120-125°C and a pressure of 60 mmHg (0.079 atm) (example I).

In regard to claim 31, D1 teaches that the pressure of the process may be carried out at 100 mmHg (0.13 atm) (example I).

13. Claims 17, 20, 29 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over D1 as applied to claim 15 above, and further in view of Brassey (US 5903591).

In regard to claim 17, D1 fails to teach a reactor that meets the requirements of the claims.

Brassey teaches a vertical reactor for the activation of carbonaceous char. the carbon is introduced at the upper end of the vertical reactor and directed down through the reactor. Steam is introduced at multiple points distributed along the height of the reactor, and excess steam escapes from an outlet at the top of the reactor. The reacted product is discharged from an outlet at the bottom of the reactor (figure 1 and column 3, lines 12-54).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the vertical reactor taught by Brassey in the process taught in D1. Such a modification would have been motivated by the teaching in Brassey that the reactor is useful in a process in which a particulate material is reacted with water vapor.

In regard to claims 20 and 29, D1 teaches a temperature of 120-125°C and a pressure of 60 mmHg (0.079 atm) (example I).

In regard to claim 32, D1 teaches that the pressure of the process may be carried out at 100 mmHg (0.13 atm) (example I).

14. Claims 21, 24 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over D1 as applied to claim 15 above, and further in view of Corson (US 3106453, hereafter D2).

In regard to claims 21 and 24, D1 fails to teach a reaction temperature greater than 250°C.

D2 teaches a process for producing dry lime hydrate in which lime is reacted with water vapor. D2 teaches that in the process the reactants should be maintained at a temperature of 212-1000°F (column 5, lines 27-31).



It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a temperature of greater than 250°C in the process taught in D1. Such a modification would have been motivated by the teaching in D2 that hydrated lime may be produced by reacting water vapor and lime at temperatures of up to 1000°F (538°C).

In regard to claim 33, D1 fails to teach a reaction pressure in the range of 0.9-1.1.

D2 teaches a reaction pressure of 90 psi (example I).

It would have been obvious to one of ordinary skill in the art at the time of the invention to select a reaction pressure in the process taught in D1 in the range of 0.9-1.1 atm. Such a modification would have been motivated by the teaching in D1 of a reaction pressure of 0.13 atm and in D2 of 6.12 atm. This range of successful pressures for a CaO/water vapor lime hydration reaction would have led one of ordinary skill in the art at the time of the invention to arrive at the required range as pressures on either side of the required range are known in the art.

15. Claims 22, 25 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over D1 and Corson as applied to claim 16 above, and further in view of D2.

In regard to claims 22 and 25, D1 fails to teach a reaction temperature greater than 250°C.

D2 teaches a process for producing dry lime hydrate in which lime is reacted with water vapor. D2 teaches that in the process the reactants should be maintained at a temperature of 212-1000°F (column 5, lines 27-31).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a temperature of greater than 250°C in the process taught in D1. Such a modification would have been motivated by the teaching in D2 that hydrated lime may be produced by reacting water vapor and lime at temperatures of up to 1000°F (538°C).

In regard to claim 34, D1 fails to teach a reaction pressure in the range of 0.9-1.1.

D2 teaches a reaction pressure of 90 psi (example I).

It would have been obvious to one of ordinary skill in the art at the time of the invention to select a reaction pressure in the process taught in D1 in the range of 0.9-1.1 atm. Such a modification would have been motivated by the teaching in D1 of a reaction pressure of 0.13 atm and in D2 of 6.12 atm. This range of successful pressures for a CaO/water vapor lime hydration reaction would have led one of ordinary skill in the art at the time of the invention to arrive at the required range as pressures on either side of the required range are known in the art.

16. Claims 23, 26 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over D1 and Brassey as applied to claim 17 above, and further in view of D2.

In regard to claims 23 and 26, D1 fails to teach a reaction temperature greater than 250°C.

D2 teaches a process for producing dry lime hydrate in which lime is reacted with water vapor. D2 teaches that in the process the reactants should be maintained at a temperature of 212-1000°F (column 5, lines 27-31).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a temperature of greater than 250°C in the process taught in D1. Such a modification would have been motivated by the teaching in D2 that hydrated lime may be produced by reacting water vapor and lime at temperatures of up to 1000°F (538°C).

In regard to claim 35, D1 fails to teach a reaction pressure in the range of 0.9-1.1.

D2 teaches a reaction pressure of 90 psi (example I).

It would have been obvious to one of ordinary skill in the art at the time of the invention to select a reaction pressure in the process taught in D1 in the range of 0.9-1.1 atm. Such a modification would have been motivated by the teaching in D1 of a reaction pressure of 0.13 atm and in D2 of 6.12 atm. This range of successful pressures for a CaO/water vapor lime hydration reaction would have led one of ordinary skill in the art at the time of the invention to arrive at the required range as pressures on either side of the required range are known in the art.

17. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over D1 as applied to claim 15 above, and further in view of Tinker et al. (US 1890202).

In regard to claim 36, D1 fails to teach that a portion of the hydrated product is returned to a hydration unit.

Tinker teaches that when the result of a chemical treatment is insufficient to achieve the desired result, the process may be repeated to increase the extent of the reaction (page 3, lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to return at least some of the hydrated lime in the process taught by D1 to the hydration unit. Such a modification would have been motivated by the teaching in Tinker that when a reaction has not taken place to the desired degree it should be repeated, and the desire to achieve a uniform hydration of the lime.

18. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over D1 and Corson as applied to claim 16 above, and further in view of Tinker.

In regard to claim 37, D1 fails to teach that a portion of the hydrated product is returned to a hydration unit.

Tinker teaches that when the result of a chemical treatment is insufficient to achieve the desired result, the process may be repeated to increase the extent of the reaction (page 3, lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to return at least some of the hydrated lime in the process taught by D1 to the hydration unit. Such a modification would have been motivated by the teaching in Tinker that when a reaction has not taken place to the desired degree it should be repeated, and the desire to achieve a uniform hydration of the lime.

19. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over D1 and Brassey as applied to claim 17 above, and further in view of Tinker.

In regard to claim 38, D1 fails to teach that a portion of the hydrated product is returned to a hydration unit.

Tinker teaches that when the result of a chemical treatment is insufficient to achieve the desired result, the process may be repeated to increase the extent of the reaction (page 3, lines 1-4).

It would have been obvious to one of ordinary skill in the art at the time of the invention to return at least some of the hydrated lime in the process taught by D1 to the hydration unit. Such a modification would have been motivated by the teaching in Tinker that when a reaction has not taken place to the desired degree it should be repeated, and the desire to achieve a uniform hydration of the lime.

20. Claim 42 is rejected under 35 U.S.C. 103(a) as being unpatentable over D1 as applied to claim 15 above, and further in view of Huege (US 5792440).

In regard to claim 42, D1 fails to teach that the source of CaO is a calciner at a cement plant.

Huege teaches that cement kiln dust is a known source of CaO (column 3, line 2).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize cement kiln dust as a source of CaO in the process taught in D1. Such a modification would have been motivated by the teaching in Huege that cement kiln dust is a known source of CaO.

21. Claim 43 is rejected under 35 U.S.C. 103(a) as being unpatentable over D1 and Huege as applied to claim 42 above, and further in view of Dumont et al. (US 5173279).

In regard to claim 43, D1 fails to teach that the calcium hydroxide produced by the process is used to absorb SO<sub>2</sub> in exhaust gases.

Dumont teaches a method of absorbing SO<sub>2</sub> by treating exhaust gases with calcium hydroxide (abstract).

It would have been obvious to one of ordinary skill in the art at the time of the invention to place the product of the reaction taught in D1 in a location where SO<sub>2</sub> needs to be absorbed. Such a modification would have been motivated by the teaching in Dumont that calcium oxide may be used to absorb SO<sub>2</sub> from exhaust gases.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEVIN M. JOHNSON whose telephone number is (571)270-3584. The examiner can normally be reached on Monday-Friday 7:30 AM to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jerry Lorengo can be reached on 571-272-1233. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/Kevin M Johnson/

Examiner, Art Unit 1793